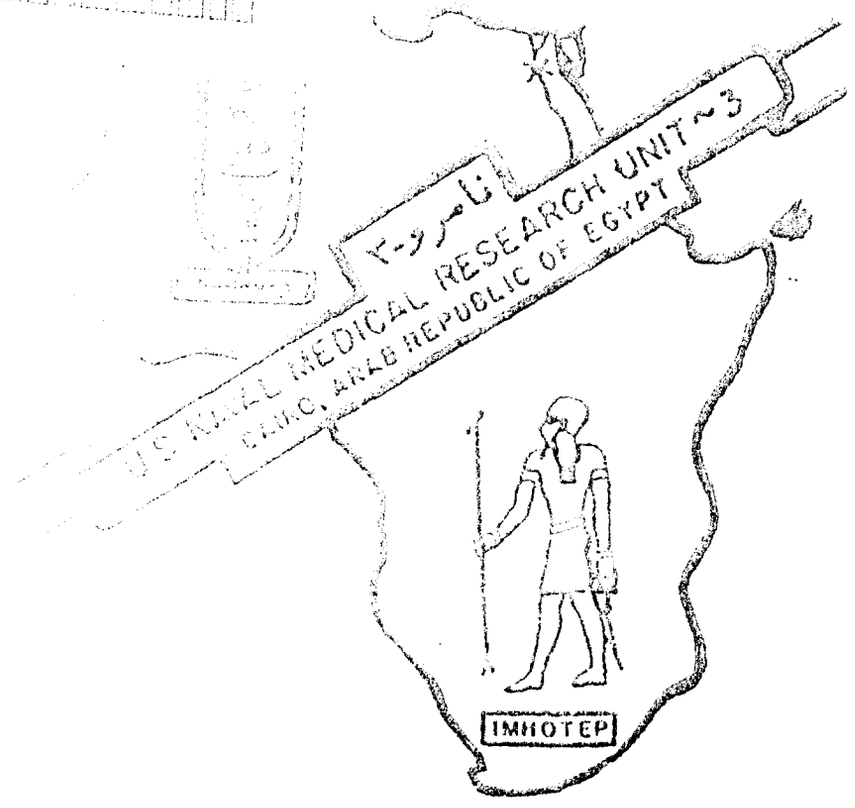


PUBLICATION REPORT

1775

9/94

SCHISTOSOMA MANSONI INFECTION 3 MONTHS AFTER PRAZIQUANTEL THERAPY AMONG FARMERS IN QALYUB, EGYPT

BY

F.R. Abu-Elyazeed, N.S. Mansour, M. Habib
and J.K. Podgore

U.S. NAVAL MEDICAL RESEARCH UNIT NO. 3
(CAIRO, ARAB REPUBLIC OF EGYPT)
PSC 452, BOX 5000
FPO AE 09835-0007

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	1993	

4. TITLE AND SUBTITLE
Schistosoma mansoni Infection 3 Months after Praziquantel Therapy among Farmers in Qalyub, Egypt

5. FUNDING NUMBERS
PE- 64758A
WU- 3M464758D849.EB

6. AUTHOR(S)
Abu-Elyazeed, R.R., Mansour, N.S., Habib, M., and Podgore, J.K.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Naval Medical Research Unit No. 3
PSC 452, Box 5000
FPO AE 09835-0007

8. PERFORMING ORGANIZATION REPORT NUMBER
9/94

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Naval Medical Research and Development Command, National Naval Medical Center
Building 1, Tower 12
Bethesda, MD 20889-5044

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Published in: J. Trop. Med., 2(4):3-7, 1993; Acc. No. 1775.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release;
Distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The prevalence of *Schistosoma mansoni* infection was 52% among 1494 male farmers aged 15-42 years old in 3 rural communities in the Qalyub region of the Nile Delta. Treatment with praziquantel at the recommended dose 40 mg/kg body weight in a single oral dose was taken by 668 (87%) of the infected farmers. After 3 months 607 (91% of the volunteers) submitted three daily faecal samples and 186 (31%) were infected. Since this study was conducted during the winter when transmission was low this 31% post treatment infection is most likely due to treatment failure. Prospective studies to evaluate optimal dosage of praziquantel and sequential treatment schedules to achieve effective control of transmission are indicated.

14. SUBJECT TERMS
Schistosoma mansoni; Treatment; Praziquantel; Farmers; Nile Delta, Egypt.

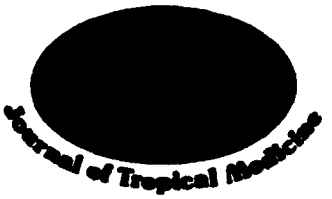
15. NUMBER OF PAGES
5

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

Journal of Tropical Medicine

JTM



The Society of Fellows of the Egyptian branch of the

Royal Society of Tropical Medicine & Hygiene

Tager Building, 1, Ozoris Street, Garden City, Cairo, Egypt. Tel.: 3541857
Legalized No. 3605

Editorial Board Address : Professor Kabil S M, 4 Green Street off 6 Souk El-Tawfiqia St., Supreme Court Sq., Central Cairo, Egypt.Tel/Fax (202):767688.

JOURNAL OF TROPICAL MEDICINE JTM May, (1993). Vol. 2, No.4, Abu-Elyazeed et al., 3 - 7

SCHISTOSOMA MANSONI INFECTION 3 MONTHS AFTER PRAZIQUANTEL THERAPY AMONG FARMERS IN QALYUB, EGYPT

Abu-Elyazeed R R, *Mansour N S, Habib M and Podgore J K

*Naval Medical Research Unit No. 3, Cairo, Egypt and *Center for Field and Applied Research, Egyptian Ministry of Health Cairo, Egypt.*

Abstract

The prevalence of *Schistosoma mansoni* infection was 52% among 1494 male farmers aged 15-42 years old in 3 rural communities in the Qalyub region of the Nile Delta. Treatment with praziquantel at the recommended dose 40 mg/kg body weight in a single oral dose was taken by 668 (87%) of the infected farmers. After 3 months 607 (91% of the volunteers) submitted three daily faecal samples and 186 (31%) were infected. Since this study was conducted during the winter when transmission was low this 31% post treatment infection is most likely due to treatment failure.

Prospective studies to evaluate optimal dosage of praziquantel and sequential treatment schedules to achieve effective control of transmission are indicated.

Introduction

Schistosomiasis is one of the most important public health problems in Egypt. It is the major occupational disease in rural areas where agricultural workers acquire the infection through repeated daily contact with schistosomal cercarial infested water (Kloos et al., 1990). Water-resource development projects for irrigation purposes have increased the areas of disease transmission. Treatment of schistosomiasis was simplified with the advent of praziquantel, a safe and effective anti-schistosomal drug. The cure rate with a single dose of 40 mg/kg body weight ranges from 72% to 100% for *S. haematobium* and 63% to 97% for *S. mansoni* (King and Mahmoud, 1989). Although praziquantel treatment achieves high cure rates, it does not prevent re-infection. How frequent it is necessary to re-treat patients to achieve lasting impact on re-infection rates is not known.

This study was designed to evaluate effectiveness of praziquantel therapy in a cohort of Egyptian farmers with *Schistosoma mansoni* infection three months after a single dose treatment during the low transmission season.

Address Correspondence and Request for Reprints to:
Research Publications Branch, U.S. NAMRU-3, On the Extent of Ramsis Street, Postal Code No. 11517 Cairo, Egypt.

Materials and Methods

Study area and study population

The study was conducted in three rural sites in the Qalyub district in the Nile Delta about 30 km north-west of Cairo, Egypt. Three villages (Halaba, Sanafeir and Aghour) were chosen because of a known high prevalence of schistosomiasis

in farmers. Male farmers 18-42 years of age, with no anti-schistosomal treatment during the previous three months, were invited to participate in this study which was the initial step of a study to evaluate a schistosomal topical antipenetrant.

Schistosomiasis Survey

Between September and November 1990, all participants were given a labeled 50 ml. plastic centrifuge tube for urine and a wide mouthed plastic screw-cap container for faeces and were asked to provide specimens the next morning. Specimen examinations were done within 2-4 hours of collection. Urine samples were examined by a sedimentation concentration technique (Mansour et al., 1981) and faecal samples were examined using the Kato-Katz thick smear method (Katz et al., 1972).

Treatment Procedure

Praziquantel in a single oral dose of 40 mg/kg was given under the supervision of Egyptian Ministry of Health physician to each farmer immediately after urine and faecal samples indicated schistosome infection.

Post-treatment stool survey

Twelve weeks after treatment, a faecal sample was collected on each of three consecutive days from each subject. Faecal samples were examined by the modified Ritchie technique, a more sensitive procedure to determine complete cure following therapy (Knight et al., 1976). If the first or second faecal sample was positive for *S. mansoni* the subject was determined to be infected and subsequent samples were not examined.

Results

Of the 1494 farmers participating in the study, 374 were from Halaba, 615 from Sanafeir and 505 from Aghour. The prevalence of *Schistosoma haematobium* infection was 0.9% and that of *Schistosoma mansoni* was 51.5%. Of the 14 individuals with *S. haematobium*, 11

Table- 1: Prevalence of *Schistosoma* infection in the study sites.

Type of infection	Halaba n=374	Sanafeir n=615	Aghour n=505	Total n=1494
S. mansoni	169(45.2%)	309(50.2%)	291(57.6%)	769(51.5%)
S. haematobium	4(1.1%)	4(0.7%)	6(1.2%)	14(0.9%)

Table- 2: *Schistosoma mansoni* infection 3 months after praziquantel therapy in the study sites.

Type of infection	Halaba n=140	Sanafeir n=257	Aghour n=210	Total n=607
S. mansoni	47(33.6%)	80(31.1%)	59(28.1%)	186(30.6%)

also had *S. mansoni*. The prevalences of *S. mansoni* and *S. haematobium* positive individuals among the three villages (table- 1) were not significantly different. All infected individuals were offered treatment with a single dose of praziquantel, but because the prevalence of *S. haematobium* was very low (0.9%), only *S. mansoni* infected individuals were included in this study. Of the 668 (86.9%) individuals treated, 607 (90.0%) provided the required consecutive daily faecal specimens during post treatment follow-up. Three months after treatment 168 of the 607 individuals (30.6%) were still infected with *S. mansoni*. There was no significant difference in prevalence of post treatment infection among the study villages (table- 2). The value of three consecutive daily faecal examinations post treatment is shown in figure- 1. The first sample identified 50% or less of those infected.

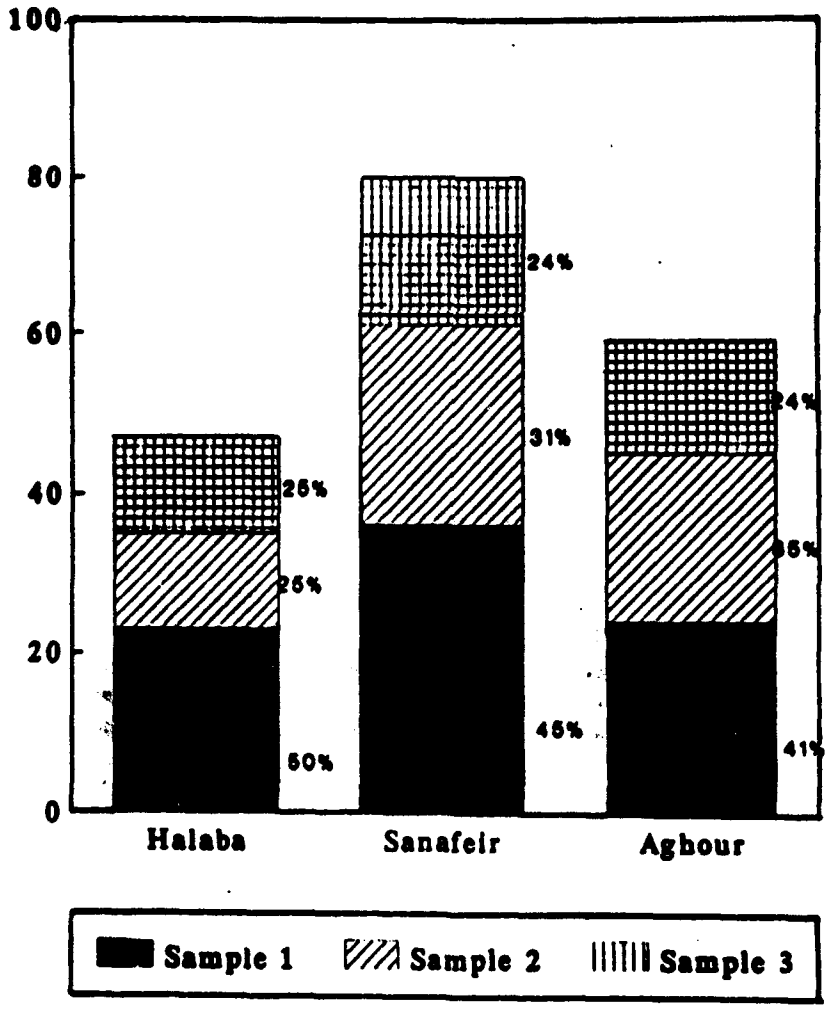


Fig. 1: The number and percent of positive cases by the examination of 3 consecutive stool samples 3 months after therapy in the study sites.

Discussion

The prevalence of *S. mansoni* infection (51.5%) at the time of this study was higher than that reported previously in this area (El-Alamy and Cline, 1977 and Cline et al., 1977). The increase in prevalence of *S. mansoni* infection is probably due to the selective nature of this study focusing only on male farmers. The prevalence of *S. haematobium* (<1%) was much lower than that reported by other investigators in this Qalyub area, but the decrease in *S. haematobium* prevalence is consistent with its dramatic decline in the Nile Delta (Abdel Wahab et al., 1979). Persistent *S. mansoni* infection after treatment may be due to infection just prior to treatment, re-infection after treatment, or treatment failure. Praziquantel affects only the mature worm stages of schistosomes, so immature stages at the time of treatment may survive, reach maturity and excrete eggs 4-6 weeks later. Exposure after treatment may result in re-infection with egg excretion after 6-8 weeks. The post-treatment *S. mansoni* infection of 31% in this study is most likely due to drug failure since the study was done during the low transmission season from December through February. This winter period is considered a low season of schistosomiasis transmission because snail breeding is minimal, most snails either die or hibernate in mid winter and human contact with infested water is greatly reduced. The 69% cure rate is consistent with studies in Sudan (Kardaman et al., 1985); Burundi (Gryseels et al., 1987); Botswana (Friis and Byskow, 1989) and Ethiopia (Simonsen et al., 1990).

Single treatment of *S. mansoni* infected individuals with praziquantel has a limited effect on schistosomiasis control. A single mass treatment may achieve 70% cure rate but will not prevent re-infection. Repeated treatment of infected individuals, or repeated mass treatment if prevalence rates are high, could achieve long-term control. A field trial to evaluate the efficacy of praziquantel in Sudan, (Kardaman et al., 1985) suggested repeating chemotherapy every 6 months for school children living in high prevalence area.

The present study suggests that examination and treatment of a population should be done at the end of the high transmission season with re-examination three months after therapy and re-treatment of infected individuals prior to the beginning of the next high transmission season. If re-examination and treatment are not conducted the high number of infected patients remaining in the population will result in a high level of transmission in the next season with persistence of endemic patterns of the disease. Improved cure rates up to 85% such as those reported by El-Masry et al., (1988), utilizing a 60 mg/kg body weight in divided doses alone or in conjunction with a 3 months follow-up treatment, would be another possible approach to reducing the high level of residual infection due to single 40 mg/kg body weight praziquantel treatment failure.

Acknowledgements

This research was supported by the U.S. Naval Medical Research and Development Command, Bethesda, MD, work unit No. 3M464758D849.EB.

The opinions and assertions contained herein are the private ones of the authors and are not to be construed as official or as reflecting the views of the Navy Department, Department of Defense, the U.S. Government or the Egyptian Ministry of Health.

References

Abdel-Wahab MF, Strickland GT,

El-Sahly A, El Kady N, Zakaria S and Ahmed L. (1979): Changing pattern of schistosomiasis in Egypt 1935-1979. Lancet. 2, 242:244.

Cline BL, Richards FO, El-Alamy M, El-Hak S, Ruiz-Tiben E, Hughes JM and Mc Neely DF. (1989): 1983 Nile Delta schistosomiasis survey: 48 years after Scott. Am. J. Trop. Med. Hyg., 41, 56:62.

El-Alamy MA and Cline BL. (1977): Prevalence and intensity of *Schistosoma haematobium* and *S. mansoni* infection in Qalyub, Egypt. Am. J. of Trop. Med. Hyg., 26, 470:472.

El-Masry NA, Bassily S and Farid Z. (1988): A comparison of the efficacy and side effects of various regimens of praziquantel for the treatment of schistosomiasis. Trans. Roy. Soc. Trop. Med. Hyg., 82, 719:720.

Friis H and Byskow J. (1989): The effect of praziquantel against *Schistosoma mansoni* infection in Botswana. Tropical Geographical Medicine. 41, 49:51.

Gryseels B, Nkulikyinka L and Coosemans MH. (1987): Field trials of praziquantel and oxaminiquine for the treatment of schistosomiasis mansoni in Burundi. Trans. Roy. Soc. of Trop. Med. Hyg., 81, 641:644.

Kardaman MW, Fenwick A, El-Igail AB, El-Tayeb M, Affalla AA and Dixon HG. (1985): Treatment with praziquantel of school children with current *S. mansoni* and *S. haematobium* infections in Gezira. Sudan Journal of Tropical Medicine and Hygiene. 88, 105:109.

Katz N, Chaves A and Pallegrino J. (1972): A simple device for quantitative stool thick smear technique in schistosomiasis mansoni. Revista Do Instituto De Medicina Tropical De Sao, 14, 397:400.

King CH and Mahmoud AF. (1989): Drugs Five Years Later: Praziquantel. Annals of Internal Medicine. 110, 290:296.

Kloos H, Higashi GI, Schinski VD, Mansour NS, Murell KD and Miller FD. (1990): Water contact and *Schistosoma haematobium* infection in a Rural village in upper Egypt. Am. J. Trop. Med. Hyg., 19, 3, 749:758.

Knight WB, Huitt RA, Line BL and Ritchie LS. (1976): A modification of the formol-ether concentration technique for increased sensitivity in detecting *Schistosoma mansoni* eggs. Am. J. Trop. Med. Hyg., 25, 818:823.

Mansour NS, Higashi GI, Schinki VD and Murell KD. (1981): A longitudinal study of *Schistosoma haematobium* infection in Quena Governorate, upper Egypt. Am. J. Trop. Med. Hyg., 30, 795.

Simonsen PE, Nega A and Furu P. (1990): Intestinal schistosomiasis among children in a labor village of Wonji Sugar Estate, Ethiopia. East African Medical Journal. 67, 532: 538.